Illinois Broadband Advisory Council

Regular Meeting | December 14, 2022

BROADBAND ADVISORY COUNCIL

MEETING AGENDA

- Call to Order
- Introductory Remarks from the Chair
- Approval of Minutes
- Office of Broadband Updates
  - Connect Illinois Broadband Grant Program
  - Digital Equity Programming + Collaboration – Robbie McBeath + Adrienne Pickett, Ph.D
  - Illinois Broadband Lab – Jeannette Tamayo
- FCC Mapping Challenge Processes – Shubhika Agarwal
- Federal Updates
  - National Telecommunications and Information Administration (NTIA) – Greg Claus
- Broadband Technology: Fiber and Fixed Wireless – Andrew Afflerbach, Ph.D, P.E.
- Broadband Affordability: the Affordable Connectivity Program (ACP) – John Horrigan, Ph.D
- Stakeholder Updates
  - Chicago Digital Equity Initiative – Devon Braunstein
- BAC Terms + Working Groups
- Public Comment
- Adjourn

Broadband Expansion

Governor Pritzker is committed to establishing Illinois as a leader when it comes to technology and innovation. Access to broadband is a critical component of staying ahead of the curve and will improve the lives of families, entrepreneurs, farmers and other Illinoisans who rely on high-speed broadband for everything from healthcare to education.

Governor Pritzker launched a statewide initiative in August 2019, **Connect Illinois**, to expand broadband access across the entire state. Connect Illinois includes a capital investment from Rebuild Illinois, the creation of a Broadband Advisory Council and Broadband Office, and a new program that will provide all Illinois public K-12 students access to high-speed broadband at no charge. The initiativ also includes a $400 million broadband grant program and a $20 million capital program for the Illinois

Illinois Century Network

Rebuild Illinois includes $20 million for the Illinois Century Network (ICN), to repair and expand the broadband network for schools, refresh aged components of the network and expand the existing network, with a focus on the K-12 portion.

The ICN is a high-speed broadband network serving K-12 and higher education institutions, public libraries and museums, state and local governments, and broadband service providers. This appropriation will also allow the ICN to provide internet and intranet connectivity for thousands of sites statewide, ensuring high availability for cloud-based content, disaster recovery services, and data, video, and audio communications. The network owns or leases approximately 2,100 miles of fiber optic cables throughout the state and interconnects with multiple regional public and private networks throughout Illinois.

Broadband Advisory Council

In the coming months, the Illinois Broadband Advisory Council will be developing an action-plan to bring reliable broadband service to every corner of the state. The **Council** is comprised of 21 voting members and 4 non-voting members.

Illinois K-12 Broadband Initiative

Governor Pritzker and the Illinois Department of Innovation & Technology are excited to announce that

ILLINOIS OFFICE OF BROADBAND
PROGRAMMING

Infrastructure

- Connect Illinois Broadband Grant Program
- Illinois Century Network | Middle Mile Broadband

Digital Equity + Engagement Programming

- Illinois Connected Communities
- Accelerate Illinois Broadband Infrastructure Planning Program
- Broadband READY (Regional Engagement for Adoption + Digital Equity)
- Computer Equity Network
- Digital Navigators (tbd)

CONNECT ILLINOIS GRANTS
ROUND 3 NOFO

Program Summary
- Grant to support broadband infrastructure that meets or exceeds state goals

Grant Amount
- Up to $10M; $350M available statewide
- Nonstate match not required

Three Categories
- Broadband Access
- Broadband Innovation
- Urban Broadband

Application Approach
- Paused for administrative rulemaking
- Rolling basis for grant review + awards

ACCELERATE:

A COMMUNITY BROADBAND PLANNING PROGRAM

Robbie McBeath

Program & Communications Coordinator

Illinois Broadband Lab

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Illinois Department of Commerce & Economic Opportunity
OFFICE OF BROADBAND
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ILLINOIS EXTENSION

ILLINOIS INNOVATION NETWORK

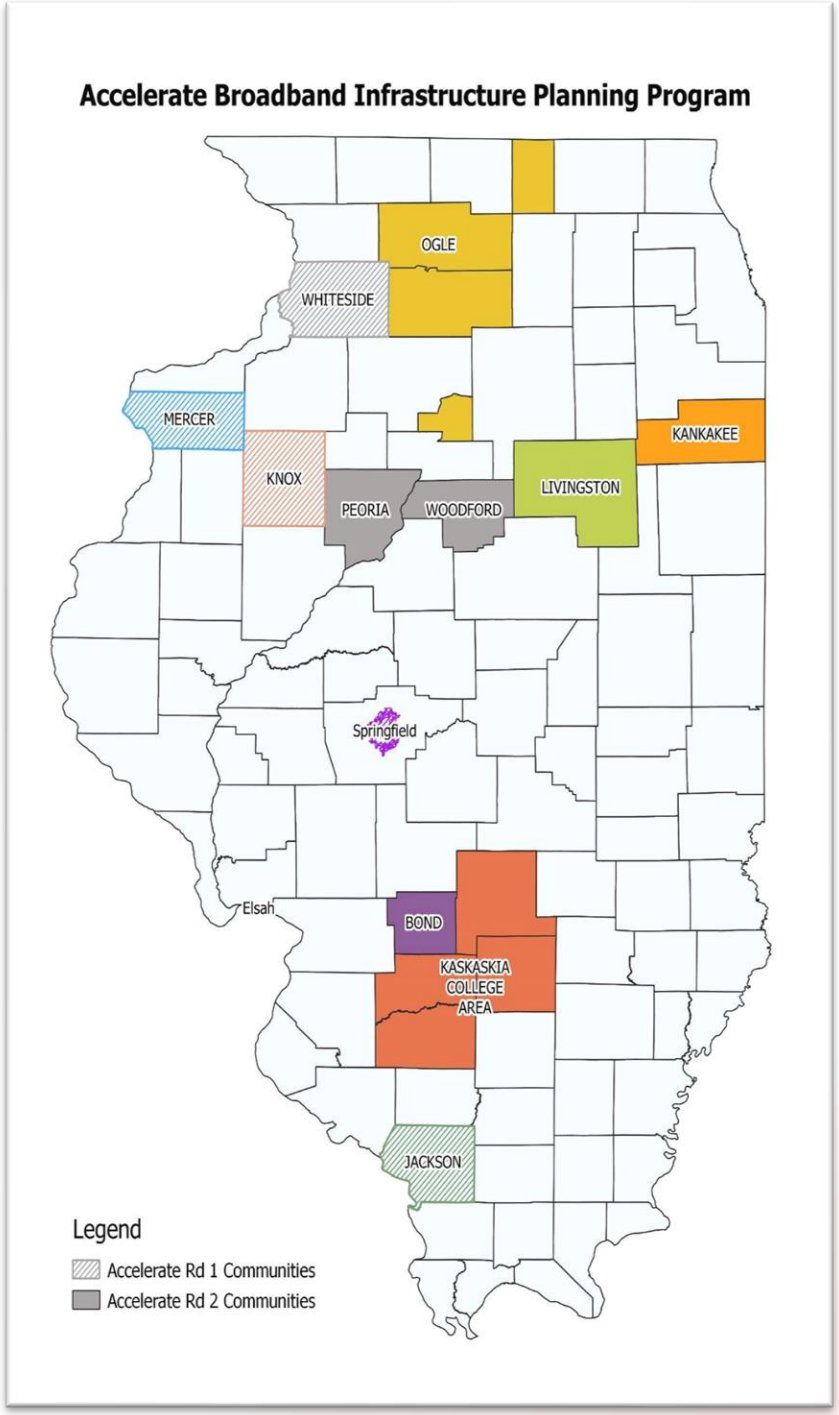
Accelerate Illinois

Previously, two 14-week cohorts: Feb – May 2022 and May – Aug 2022

3rd Cohort set to begin early January 2023

The Approach:

- No funding | 'Notice of Collaboration Opportunity'
- 30+ hrs of expert consultation and facilitation
- Vision statement
- Community survey &. mapping analysis
- Provider interviews
- Strategic plan
- Target capital dollars to support broadband infrastructure implementation
- Create and deliver a final presentation to peer communities and community governing boards



Cities, villages, counties, or multi-county regions are eligible applicants.

Why a county-level focus?

> "County governments combine the self-interest and organizational capacity to spur broadband deployment at meaningful scale."

Counties Can Provide Leadership

- Budget
- Relationships across jurisdictions
  - Downward to municipalities, townships, and schools
  - Upward to regional planning commissions, state and federal agencies
- Connection to the citizenry
- Recognized convener on key community issues

The County Has Expertise

To Spur Deployment

County Administrator

Information Technology

Public Safety

Engineering

Mapping and Property Information

Finance

To Spur Value

Economic Development

Public Health

Human Services

Smart Infrastructure

Workforce Training

Public Safety

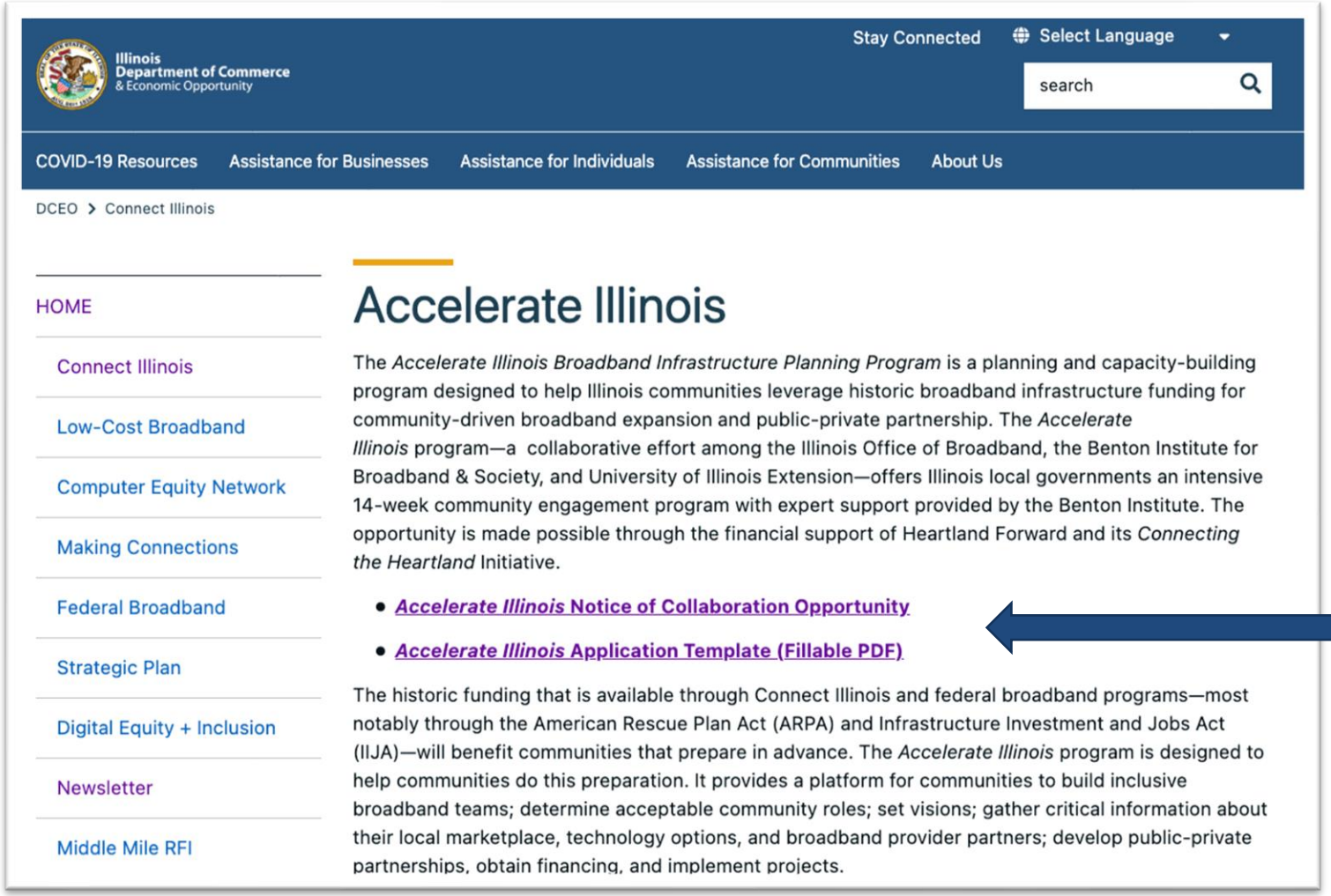
Libraries

https://dceo.illinois.gov/connectillinois ← Illinois Office of Broadband

https://dceo.illinois.gov/connectillinois/accelerate-illinois.html ← *Accelerate* Landing Page

↓

https://go.illinois.edu/accelerate



← NOCO & Application

Ag-Focused Cohort:
Broadband Breakthrough

Broadband Breakthrough is a 16-week agricultural-focused cohort of five counties that will field test a *Rural Broadband Infrastructure Planning Tool* created by a research team from the Illinois State University Department of Geography, Geology and Environment.

The project will provide: a strong, measurable rationale for broadband infrastructure investment, a process to validate and field-test the Planning Tool in select Illinois counties, and an education and engagement program for rural farming communities to plan and cost their infrastructure investment.

14 Eligible Counties (5 will be selected):

Bond, Christian, Clinton, Edgar, Hancock, Henry, Iroquois, Kankakee,

LaSalle, Macoupin, McLean, Ogle, Washington, and Wayne

USB UNITED SOYBEAN BOARD

ILLINOIS SOYBEAN ASSOCIATION

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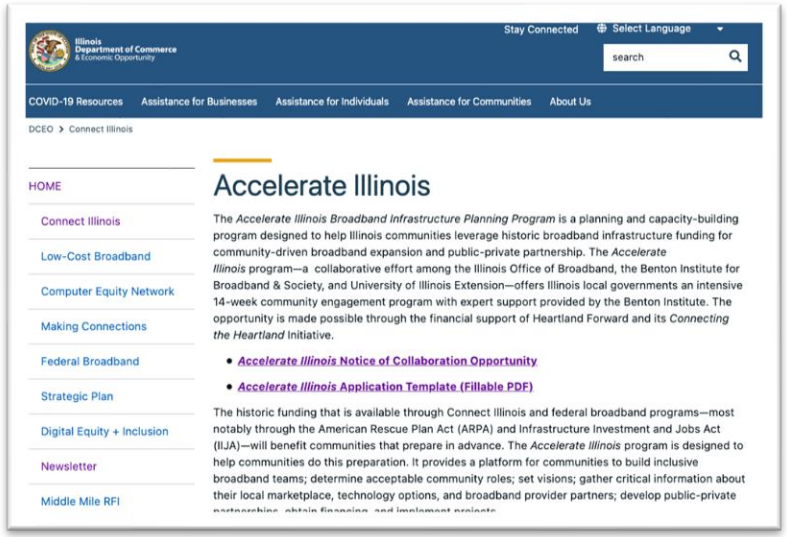
Next Steps

- Review NOCO & Application — Read Carefully!
  - Get your teams organized!
- Apply!

  Deadline: December 16, 2022
- Preview the *Accelerate* Guidebook



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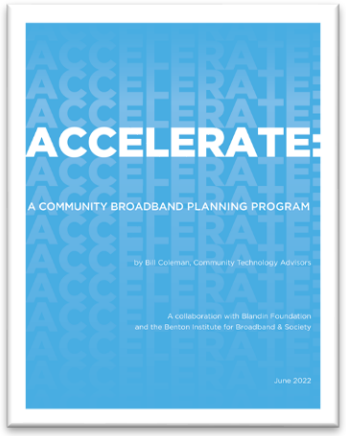

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Benton.org/Publications/Accelerate

Application-Specific Questions:
broadband@illinois.gov

Accelerate Program-Specific Questions:
Robbie McBeath, mcbeath1@uillinois.edu

Broadband Breakthrough-Specific Questions:
Bill Coleman, bcoleman@benton.org

ILLINOIS BROADBAND **R**EGIONAL **E**NGAGEMENT FOR **A**DOPTION AND **D**IGITAL EQUIT**Y** (BROADBAND **READY**)

Adrienne Pickett, Ph.D.

Visiting Coordinator for Broadband, Illinois Broadband Lab

Broadband Advisory Council Meeting

December 14, 2022

Illinois Department of Commerce & Economic Opportunity (DCEO), Office of Regional Economic Development, Statewide Regional Map

https://www2.illinois.gov/dceo/SmallBizAssistance/RegionSpecificAssistance/Pages/default.aspx

TEAMS

Cohort 1: 2020-21

Regional 1 Planning Council: Northern Stateline

Eastern Illinois University: Southeast

Southern Illinois University: Southern

University of Illinois – Urbana-Champaign: East Central

Highlights: Southeast Region's librarian-based train the trainer digital skills program at Mattoon and Charleston schools and libraries

Southern Region's Eurma C. Hayes Community Technology Center Ribbon Cutting in Carbondale

Cohort 2: 2021-22

Bloomington Normal Economic Development Council: North Central

Chicago State University: Northeast

Northern Illinois University: Northwest

Southern Illinois University – Edwardsville: Southwest

University of Illinois – Springfield: Central

Western Illinois University: West Central

Highlights: Southwest Region's collaboration with PCs for People's affordable computing device distributions in East St. Louis

West Central Region's digital literacy training courses in cybersecurity and data analytics

Next steps for **Broadband READY Program:** Additional Funding for Regional Project Expansion

Final Cohort Two Meeting this Friday, December 16 @ 1pm:

1) 5-7-minute presentations of regional projects
2) Preview of Year Two READY funding opportunity
3) Discussion of team and project expectations
4) End of the year deadline for regional teams to express interest in Year Two funding
5) Questions? **broadband@illinois.gov**

ILLINOIS INNOVATION NETWORK

Update on DEA Planning Illinois Broadband Lab

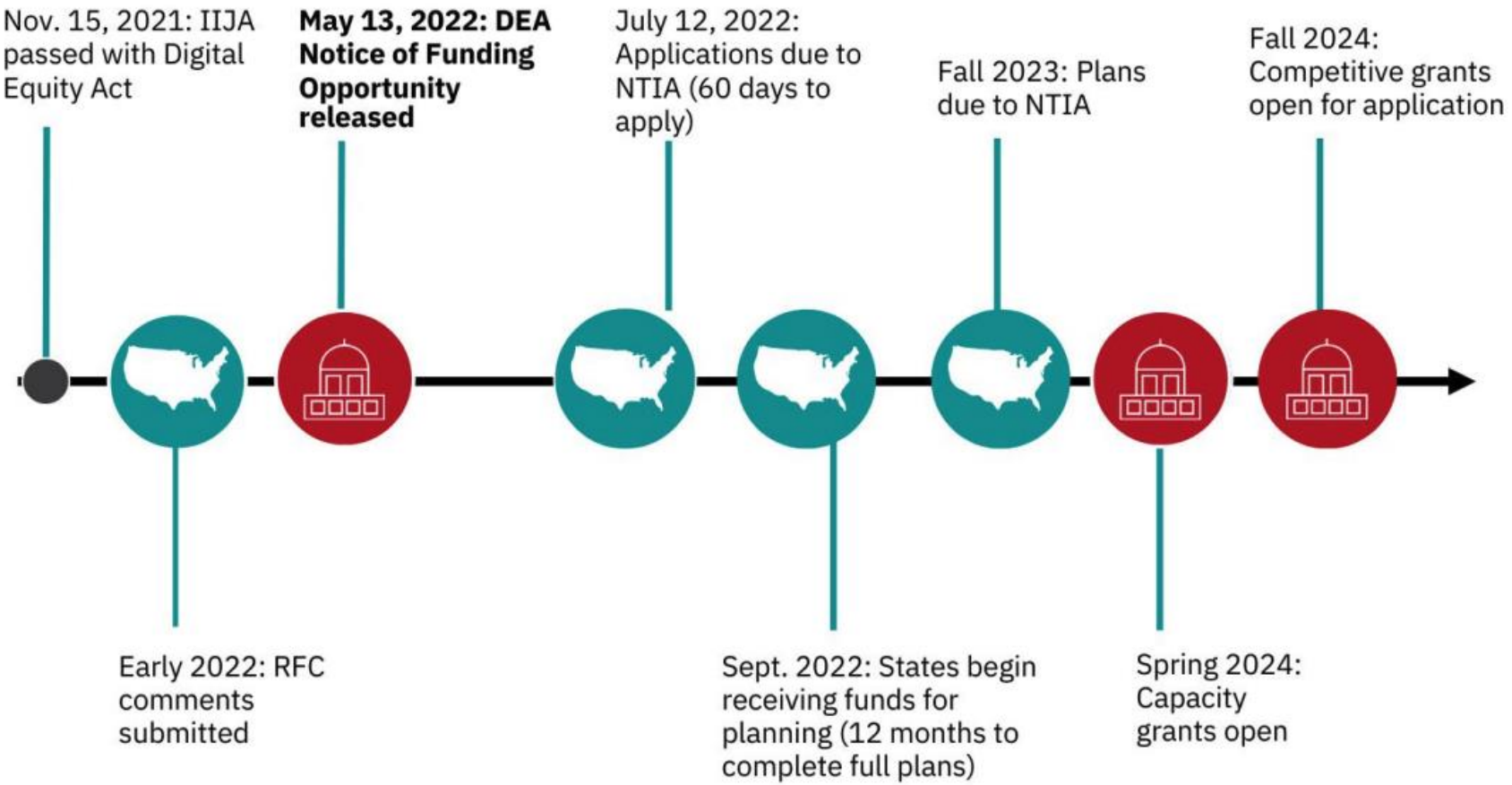
Jeannette Tamayo, Associate Vice President for Workforce Development and Community Engagement

Federal Reserve Bank - NDIA Workshops

- Charlotte, NC: Sept 14-15
- Philadelphia, PA: Sept 20-21
- Kansas City, MO: Sept 29-30
- Dallas, TX: Oct 3-4
- Louisville, KY: Nov 1-2
- New York, NY: Nov 7-8
- Denver, CO: Nov 30-Dec 1

47/56 eligible state & territories attended a workshop

Timeline



NDIA
NATIONAL DIGITAL INCLUSION ALLIANCE

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NDIA
NATIONAL DIGITAL INCLUSION ALLIANCE

RECOMMENDED OUTLINE FOR STATE/TERRITORY/ DISTRICT DIGITAL EQUITY PLAN

SECTION I: INTRODUCTION & VISION FOR DIGITAL EQUITY

1. Introduction
2. Vision Statement
3. Mission Statement
4. Values
5. Goals
6. Planning Process Overview

SECTION II: COLLABORATION & STAKEHOLDER ENGAGEMENT

1. Description of coordination and outreach strategy for the plan's development
2. Description of planned collaborations with key stakeholders to achieve the outlined measurable objectives
3. List of organizations collaborated with to develop the plan (may be an appendix)

SECTION III: BARRIERS & ASSETS

1. Needs Assessment: Identify & Inventory Barriers to Digital Equity
2. Asset Inventory: Identify & Inventory Digital Equity Assets

SECTION IV: DEFINING OBJECTIVES & ASSESSING IMPACT

1. Create measurable objectives for promoting and advancing "measurable objective categories" on behalf of general and covered populations
2. Integrate local digital equity plans into the plan's objectives
3. Assess and explain connection between measurable objectives and existing statewide goals

SECTION V: IMPLEMENTATION

1. Strategies
2. Coordination with BEAD and other DE programs
3. Program evaluation plan
4. Timeline
5. Closing

Covered Populations

- Individuals who live in covered households;
- Aging individuals;
- Incarcerated individuals, other than individuals in a Federal correctional facility;
- Veterans;
- Individuals with disabilities;
- Individuals with a language barrier, including individuals who—
  - Are English learners; and
  - Have low levels of literacy;
- Individuals who are members of a racial or ethnic minority group; and
- Individuals who primarily reside in a rural area

NDIA
NATIONAL DIGITAL INCLUSION ALLIANCE

3 TIPS FOR CREATING AN ACTIONABLE, ROBUST PLAN

1. Build your planning process and its implementation on meaningful community engagement. Listen and collaborate with partners and stakeholders early and often.
2. Begin with a comprehensive understanding of your assets and gaps, so you can plan where to go.
3. Design the plan and its components with your end goal in mind.

DIGITAL EQUITY ECOSYSTEM
PARTNERS AND ORGANIZATIONS

1. ORGANIZATIONS DELIVERING DIGITAL INCLUSION PROGRAMS

DIGITAL INCLUSION ORGANIZATIONS: Organizations whose primary purpose is to provide direct digital inclusion services and resources to under-connected communities

- Digital Skills Training
- Access to Affordable/Free Internet
- Access to Affordable/Free Computer Devices

ORGANIZATIONS WITH DIGITAL INCLUSION PROGRAMS: Organizations providing digital inclusion services and programs to under-connected communities

- Local, County, and State Libraries
- Computer Refurbisher Organizations
- Workforce Development Organizations
- Adult Education Organizations
- Connecthome - Housing Authorities

2. ORGANIZATIONS PROVIDING DIGITAL INCLUSION RELATED SERVICES

HOUSING ORGANIZATIONS: Organizations that focus on providing affordable housing options to low-income families with some level of wraparound services as well as open Wi-Fi, computer labs, loaner devices, and digital navigation, workforce, and shelf-science programs

- Affordable Housing Organizations
- Local/State/Federal Housing Agencies- Self-Sufficiency Programs
- Private and Nonprofit Housing Providers

EDUCATIONAL INSTITUTIONS: Education organizations serving disenfranchised areas and populations. These organizations help provide digital inclusion resources and services, such as one-to-one student computer devices, hotspot, free Wi-Fi, technical support, digital skills training, and volunteers

- K-12-School - After school and parent learning programs
- Local Colleges - technical programs
- Universities - Research and internship programs

3. ORGANIZATIONS SUPPORTING DIGITAL INCLUSION EFFORTS

PHILANTHROPIC ORGANIZATIONS: Funding institutions serving disenfranchised communities - help support digital inclusion efforts and programs by providing grants and connections to community organizations

- Community Foundations
- Private Foundations
- Corporate Foundations and Social Responsibility Programs

BUSINESS/FOR-PROFIT ORGANIZATIONS: Private businesses and organizations that, through social responsibility, also focus on supporting community development and services for minority and disenfranchised communities

- Banks
- Internet Services Providers
- Tech Organizations
- Business and Entrepreneurs

GOVERNMENT AND ADMINISTRATIVE ORGANIZATIONS: Local, County, Regional, and State agencies that work to provide and/or support digital inclusion services and policy

- Municipal and County Governments
- Regional Planning Commissions and Councils of Government
- Economic Development Agencies, Public Utilities, and Smart City Organizations
- State Broadband Offices and/or Commissions
- State Agencies that Support Elements of Digital Inclusion

4. DIGITAL EQUITY ADVOCACY AND ISSUE-BASED ORGANIZATIONS

ISSUE-BASED ADVOCATES AND ORGANIZATIONS: People and organizations that work to serve and connect opportunities around certain issue areas

- Civic/Civil Rights Organizations
- Health Institutions
- Media and Arts Organizations
- Startup and Tech Supporting Organizations

KEY POPULATION AND IDENTITY GROUPS FOCUSED ORGANIZATIONS: People and organizations that serve these key populations:

- Individuals with disabilities
- Older adults individuals
- Individuals with language barriers
- Individuals who are English learners
- Individuals with low levels of literacy
- Veterans
- Justice-involved individuals
- Individual experiencing homelessness
- Communities of color
- Native and Tribal communities

PLACE-BASED ORGANIZATIONS: People and organizations that focus on supporting a particular community within a geographic area

- Faith-Based Organizations
- Neighborhood Associations
- Community Based Coalitions
- Community Anchor Institutions

Contact

Adrienne Pickett, *Visiting Broadband Coordinator*
Illinois Broadband Lab
apickett@uillinois.edu

Robbie McBeath, *Visiting Broadband Coordinator*
Illinois Broadband Lab
mcbeath1@uillinonis.edu

Shubhika Agarwal, *Visiting Broadband Coordinator*
Illinois Broadband Lab
sa38@uillinois.edu

Jeannette Tamayo, *Associate Vice President*
Office of Economic Development and Innovation
University of Illinois System
jtama2@uillinois.edu

Kyle Harfst, *Associate Vice President*
Office of Economic Development and Innovation
University of Illinois System
kharfst@ullinois.edu

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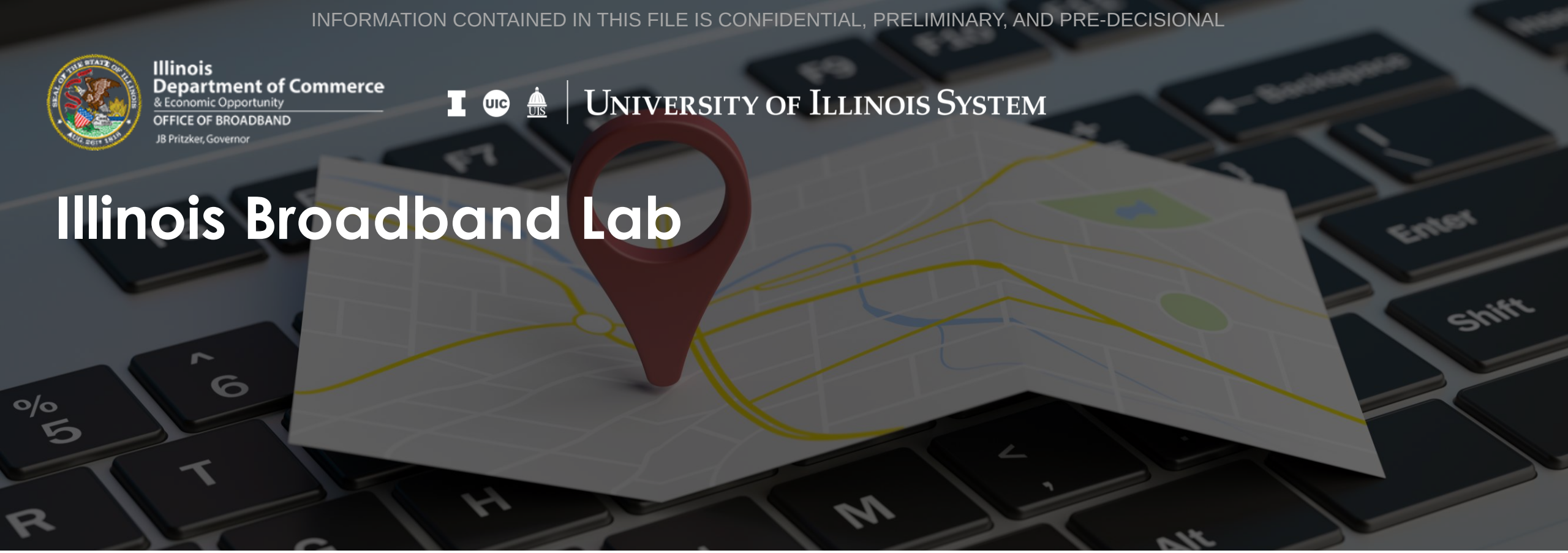


Illinois Broadband Lab

CLOSING THE DIGITAL DIVIDE IN ILLINOIS

MAXIMIZING IMPACT VIA IIJA BEAD AND DIGITAL EQUITY FUNDING

November 22, 2022

Right now is an important moment in Illinois' journey to close the digital divide and drive digital equity

The **Bipartisan Infrastructure Law and ARPA Capital Projects Funds** may provide ~$75 billion to expand high-speed internet access by funding planning, infrastructure deployment and digital equity programs in all states and territories

This funding can enable State to expand and accelerate work to bring high-speed internet access and digital equity to all in Illinois

Illinois Broadband Lab has four near-term priorities

Deep dive to follow

1 FCC Challenge

- Mobilizing residents to improve the new maps
- Enables maximum BEAD allocation

2 ARPA CPF

- $254M in funding sub-granted via Connect Illinois

3 BEAD Planning

- IL could receive on the order of ~$1B for infrastructure deployment
- Action plan due July 2023

4 Digital Equity Plan

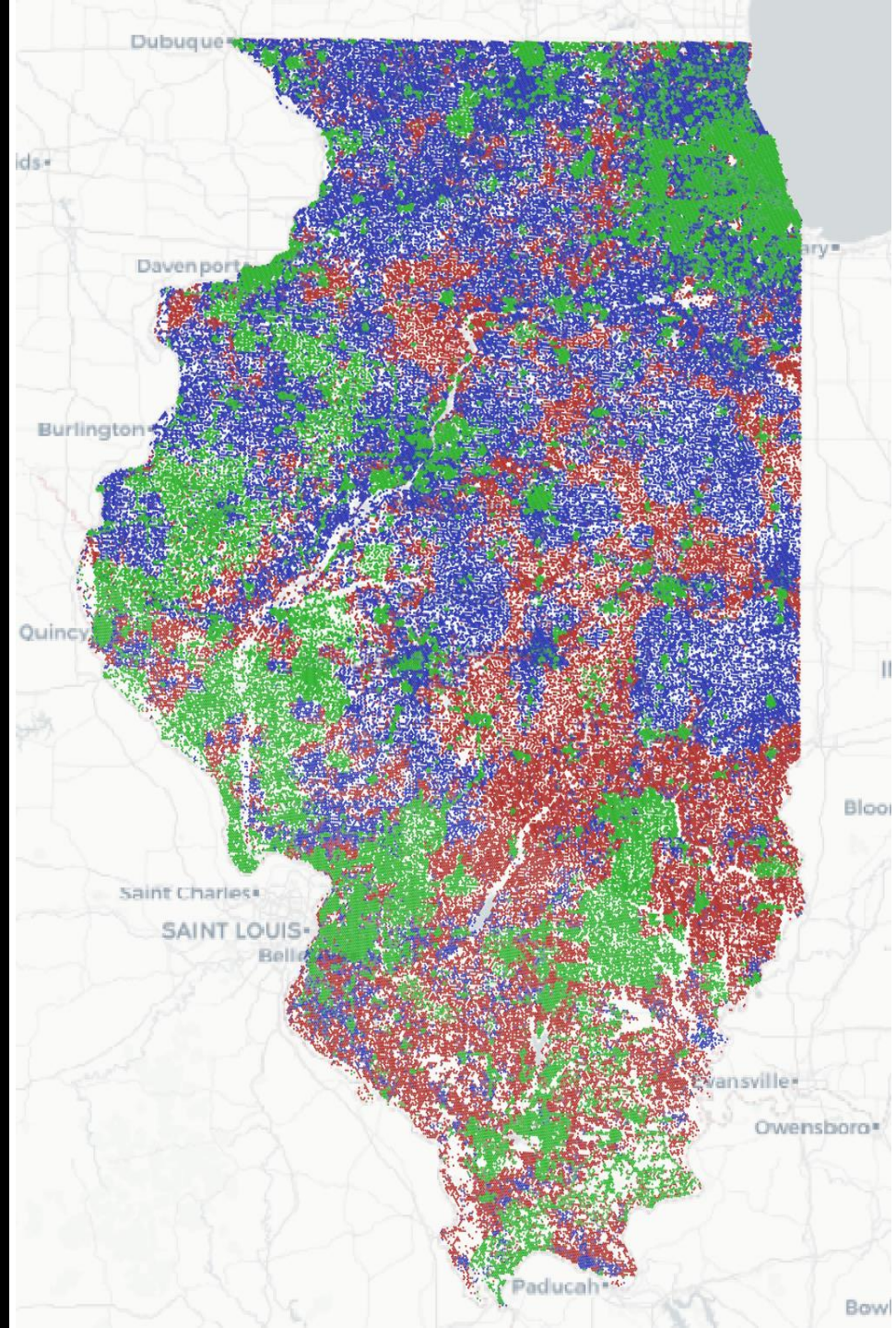
- IL could receive $35M over 5 years for digital inclusion initiatives

According to the Nov 22 FCC maps, there are 192K (5%) unserved and 1,142K (28%) underserved Broadband Serviceable Locations in Illinois

- Unserved BSLs
- Underserved BSLs
- Served BSLs

BSL: Broadband Serviceable Location

Source: Nov 22 FCC data maps



By the numbers: Illinois broadband infrastructure

~192k *(5%)*
Unserved

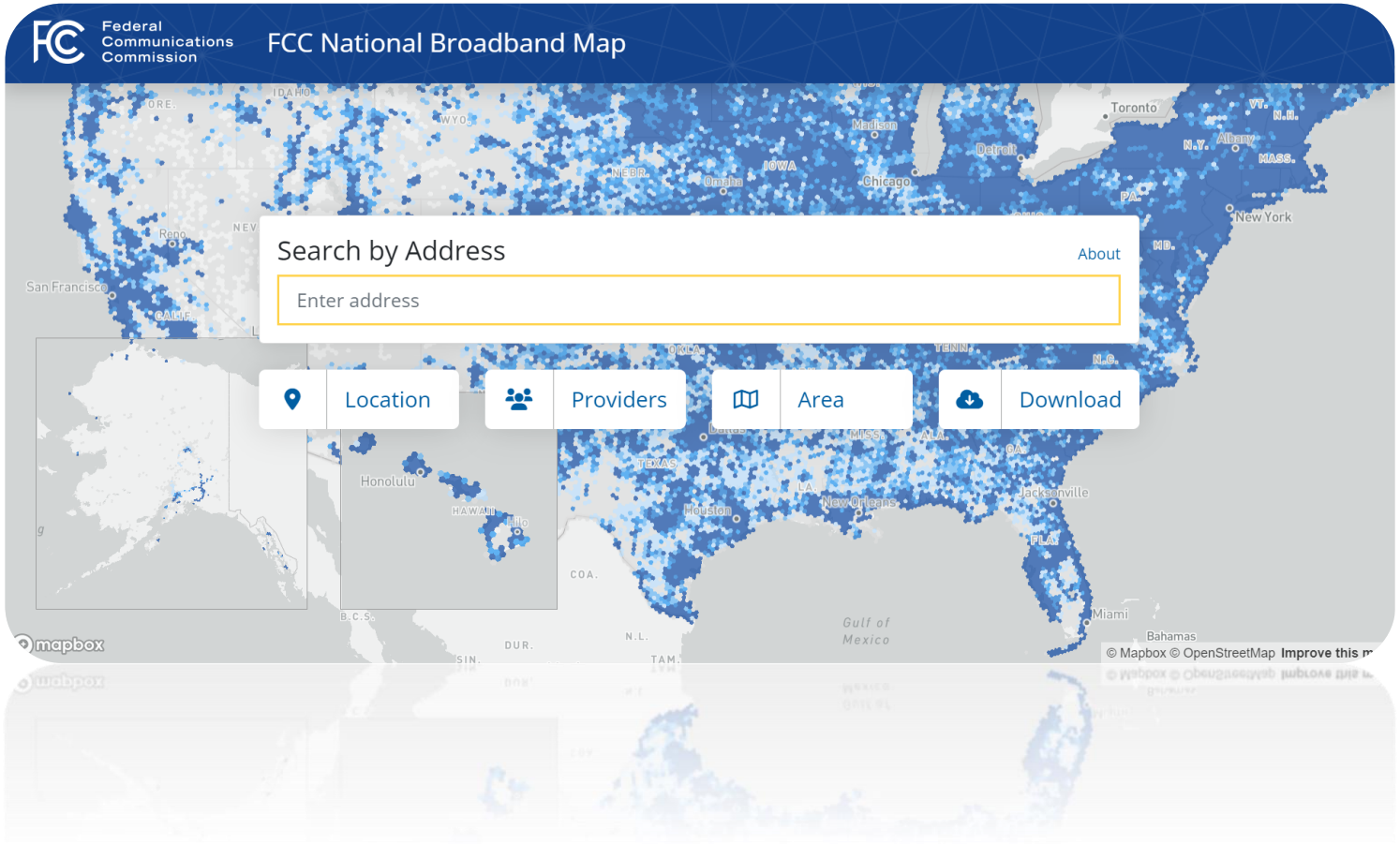
~1,142k *(28%)*
Underserved

~2,797k *(68%)*
Served

~4,131K
Total BSLs

The FCC has developed a “challenge process” to help improve the newly released maps

The “post-challenges” broadband availability map will be the basis of BEAD allocation



Timeline of the challenge

- On Nov 18, 2022, the FCC released **updated broadband maps**
- Until January 13, 2023, the FCC is **accepting inputs ‘challenging’ the accuracy of the maps**
- The **more improvements** we can make to the maps before January 13, 2023, the **better positioned we are to bridge the digital divide in IL**

Illinois Broadband Lab developed a four-point strategy to ensure the maps are as accurate as possible

Identify Broadband Serviceable Locations through mapping analytics

Mobilize consumers through existing relationships and partner networks

Conduct targeted outreach to areas with high density of FWA and Copper locations

Submit bulk challenges in key areas identified by analytics

We need your help to reach the members of your community!

The current work will feed into the broader stakeholder engagement for BEAD and Digital Equity planning starting in early 2023

What can you do today? We will provide you with a toolkit to share with your constituents

Illinois Department of Commerce & Economic Opportunity
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Help Illinois get high speed internet for all!

Follow these steps to improve the FCC Broadband Maps:

1. Search for your address at BroadbandMap.fcc.gov
2. Click on ⚙ and under Technology, check the box labeled "All Wired and Licensed Fixed Wireless" to select for reliable broadband technologies.
3. Is the location information wrong? Click "Location Challenge."
4. Are any internet services listed not available? Click "Availability Challenge."

For questions, email broadband@illinois.gov
OR visit our website by typing in the URL:
https://dceo.illinois.gov/connectillinois/fcc-broadband-challenge.html
or scanning this QR code with your phone

Connect Illinois

Accelerate Illinois

Affordability Study

ADVISORY COUNCIL

Digital Equity + Inclusion

BROADBAND GRANTS

Broadband READY

Communities Rd 1

FCC National Broadband Map Challenge

Right now is an incredibly important time in Illinois' journey to close the digital divide and drive digital equity. The new FCC Broadband maps have been released, and by January 13, 2023, we need to ensure that the Illinois information contained in these maps is accurate. Accurate maps means that Illinois can receive its fair share of federal funds that will be allocated later this year. This will enable us to expand and accelerate work to bring high-speed internet to all in Illinois. Ask your constituents or members to submit information via the **survey**.

- Find additional information if you are an **Illinois resident**
- Find additional information if you are a **partnering organization**
- **Frequently asked questions**

https://dceo.illinois.gov/connectillinois/fcc-broadband-challenge.html

We have a historic opportunity to make huge strides in closing the digital divide in Illinois

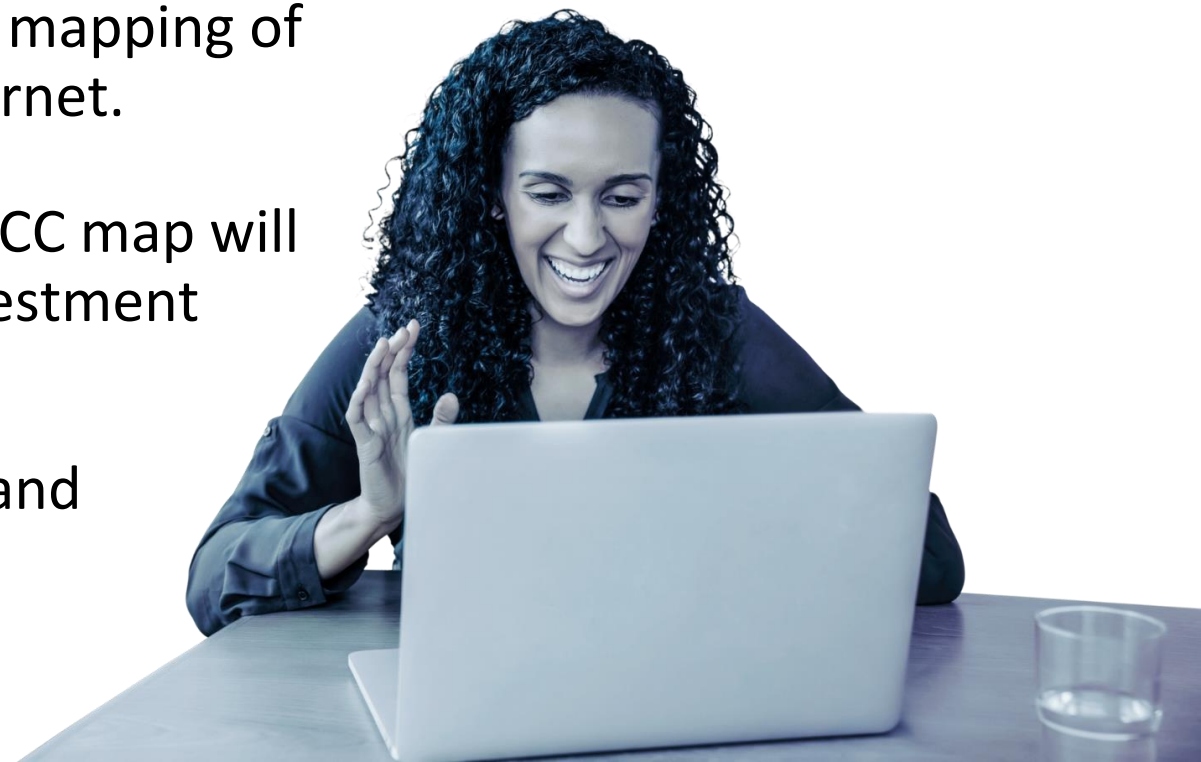
And we need your help to make it happen

Illinois Office of Broadband has made available resources that all Illinois residents, local governments, and other partners can utilize to help us get an accurate mapping of the areas in our state without high-speed internet.

Why your help is needed now? An accurate FCC map will result in more funding and more targeted investment

How can you help? Visit FCC or IOB websites, evaluate the FCC's National Broadband map, and challenge any errors by January 13, 2022.

Questions? Contact broadband@illinois.gov



Federal Updates

Greg Claus

NTIA

Illinois Received **BEAD Grant** Initial Planning Funds

Initial Planning Grant
$5M

A program to get all Americans online by funding partnerships between states or territories, communities, and stakeholders to build infrastructure where we need it to and increase adoption of high-speed Internet.

PROGRAM HIGHLIGHTS

Entities eligible to apply for this program include:

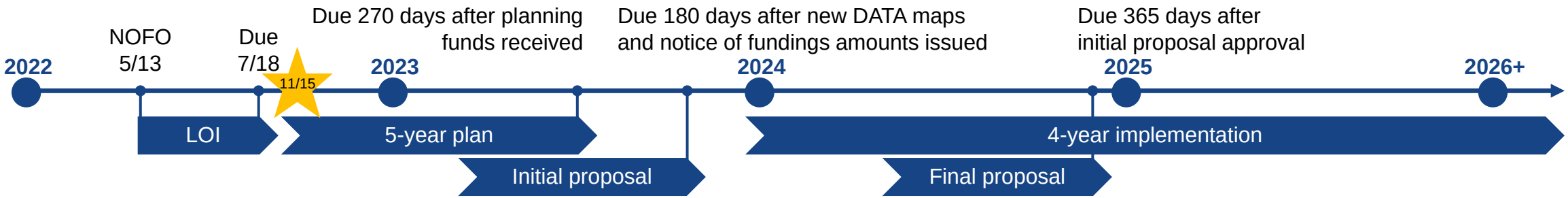
- All 50 States
- The District of Columbia and Puerto Rico
- Other Territories: U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands

Example eligible uses of funds include:

- Planning for deployment of Internet
- Deploying or upgrading Internet
- Installing Internet in multi-tenant buildings
- Implementing adoption and digital equity programs
- Workforce and job training

ESTIMATED TIMELINE

Timeline approximate unless exact date specified



Illinois Received **State Digital Equity Grant** Planning Funds

Initial Planning Grant
$1,515,352

Three Digital Equity Act programs provide funding to promote digital inclusion and advance equity for all. They ensure all communities access and use affordable, reliable high-speed Internet to meet their needs and improve their lives.

PROGRAMS HIGHLIGHTS

The Digital Equity Act created three programs:

State Planning
- $60M formula funding program to develop digital equity plans

State Capacity
- $1.44B formula funding program to implement plans & promote digital inclusion

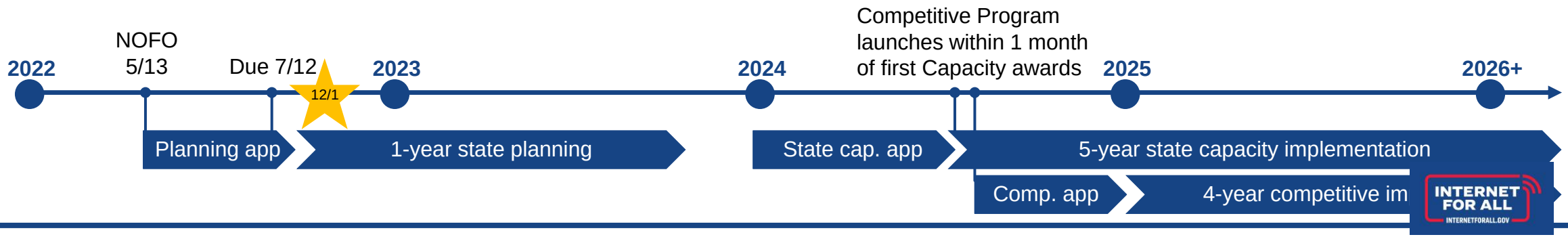
Competitive
- $1.25B to implement digital equity and inclusion activities

Example eligible uses of funds include:

- Developing digital equity plans; states must develop a plan to be eligible for state capacity grants
- Making awards to other entities to help make digital equity plans
- Improving accessibility and inclusivity of public resources
- Implementing digital equity plans and related activities
- Providing digital literacy and digital skills education
- Facilitating the adoption of high-speed Internet

ESTIMATED TIMELINE

Timeline approximate unless exact date specified



Greg Claus
Federal Program Officer, Illinois
NTIA
gclaus@ntia.gov (202) 834-0139

ctc technology & energy

engineering & business consulting

Fixed Wireless Technologies and Their Suitability for Broadband Delivery

December 2022

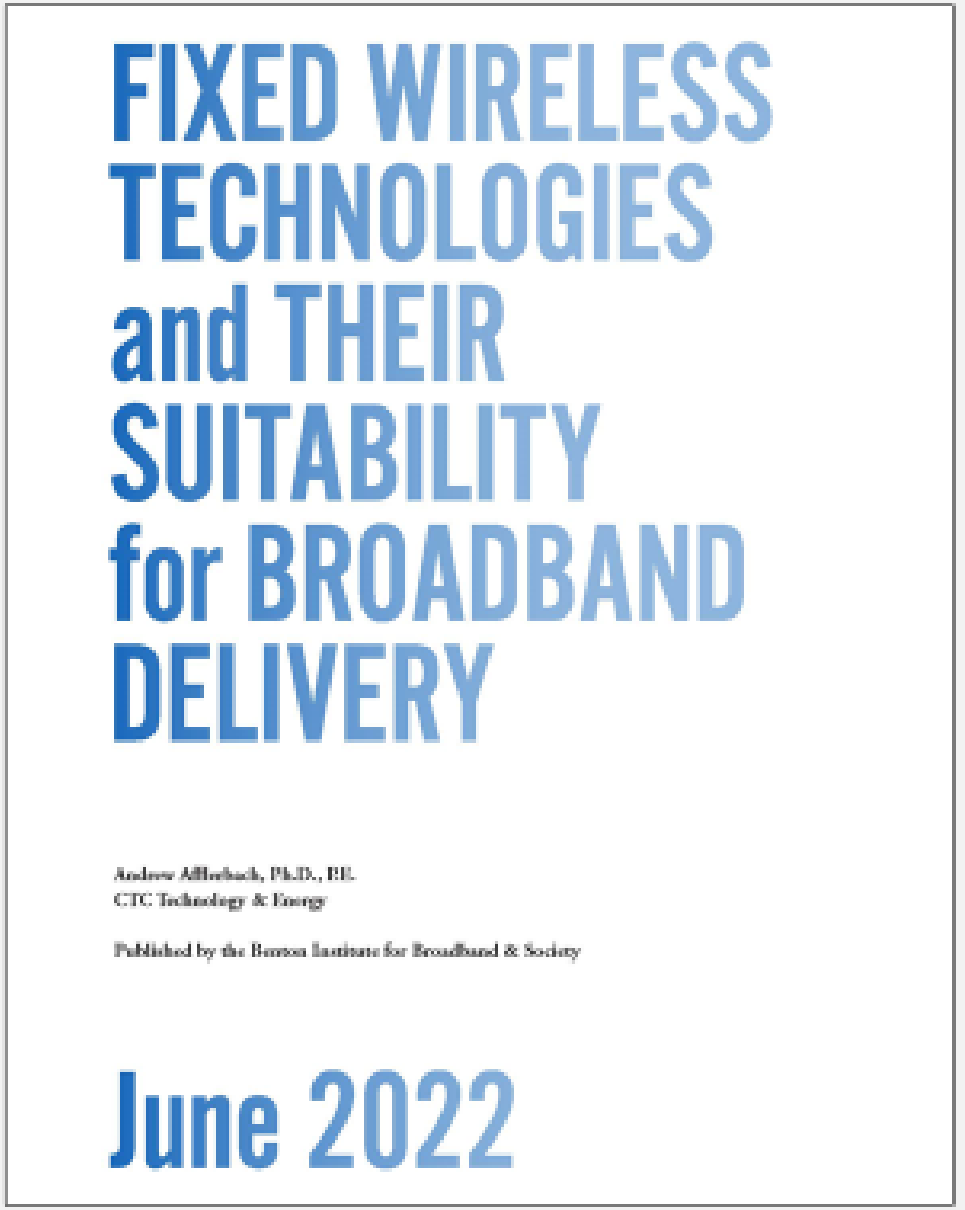
Presentation to Illinois Broadband Advisory Council

Andrew Afflerbach, Ph.D., P.E. | Chief Technology Officer

SUMMARY

1. Introduction to fixed wireless technologies, their performance and technical challenges
2. How much bandwidth will households need and why?
3. Cost models for a range of unserved communities

Available at https://www.benton.org/publications/FixedWireless



FIXED WIRELESS FACES SIGNIFICANT CHALLENGES AS A LONG-TERM STRATEGY FOR BROADBAND IN UNSERVED AREAS

In the long term, fiber and fixed wireless costs are comparable, taking into account that fixed wireless networks require frequent equipment replacement

Fully and consistently serving unserved households in rural areas is more complex using fixed wireless

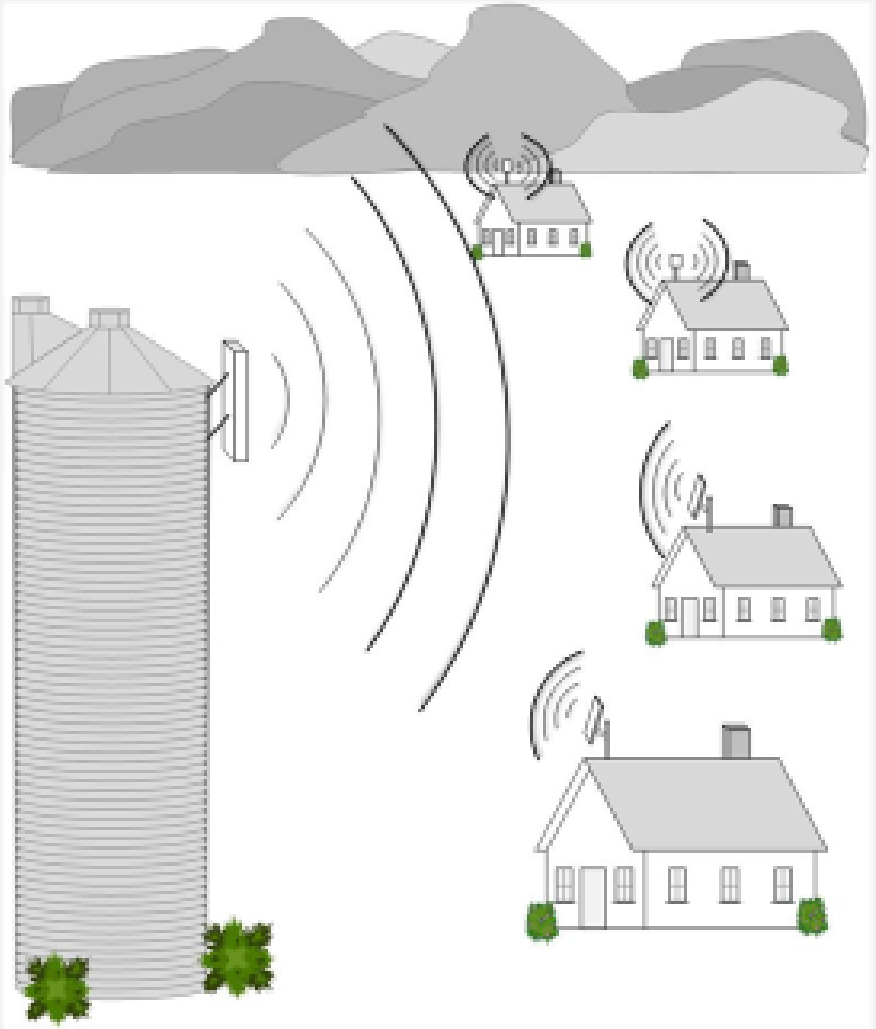
Fixed wireless delivers many factors less capacity and is less scalable for the future broadband world

FIXED WIRELESS DELIVERS SERVICE VIA ANTENNAS AT A BASE STATION AND A USER'S LOCATION

Fixed wireless access point antennas are mounted at a base station (typically on towers, masts, monopoles, or rooftops)

Access points connect back to the internet over a high-speed connection (usually fiber)

A single base station antenna site can deliver broadband to hundreds of users, depending on technology, terrain, and density



BROADBAND FIXED WIRELESS TECHNOLOGIES ARE ORGANIZED BY SPECTRUM

Each spectrum frequency has unique coverage and capacity capabilities

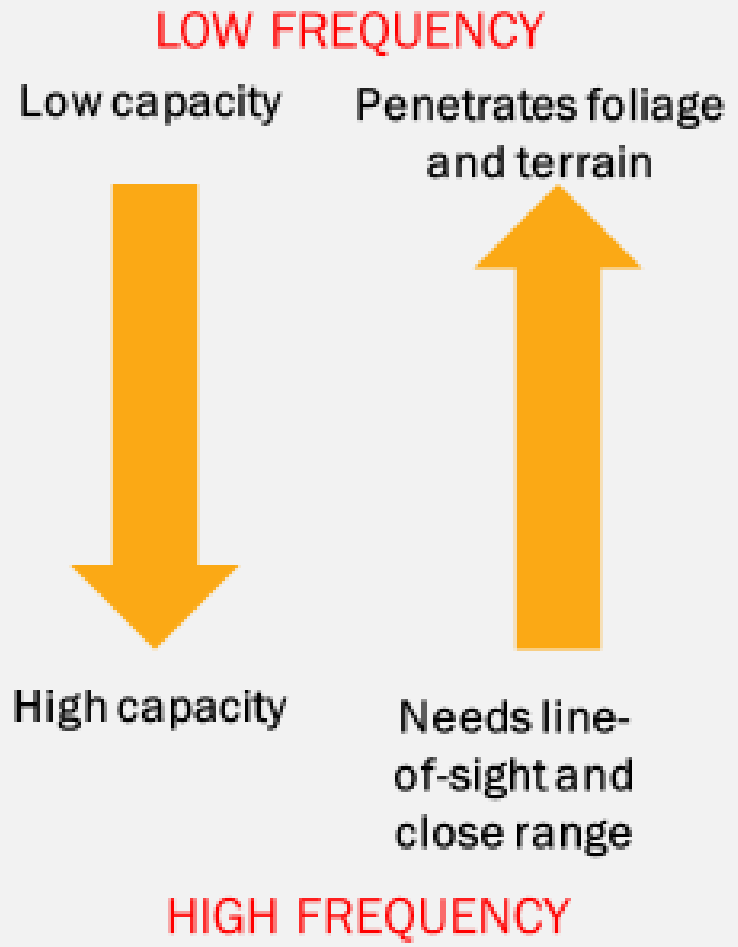
Low-band and mid-band licensed mobile cellular bands

Unlicensed fixed wireless bands

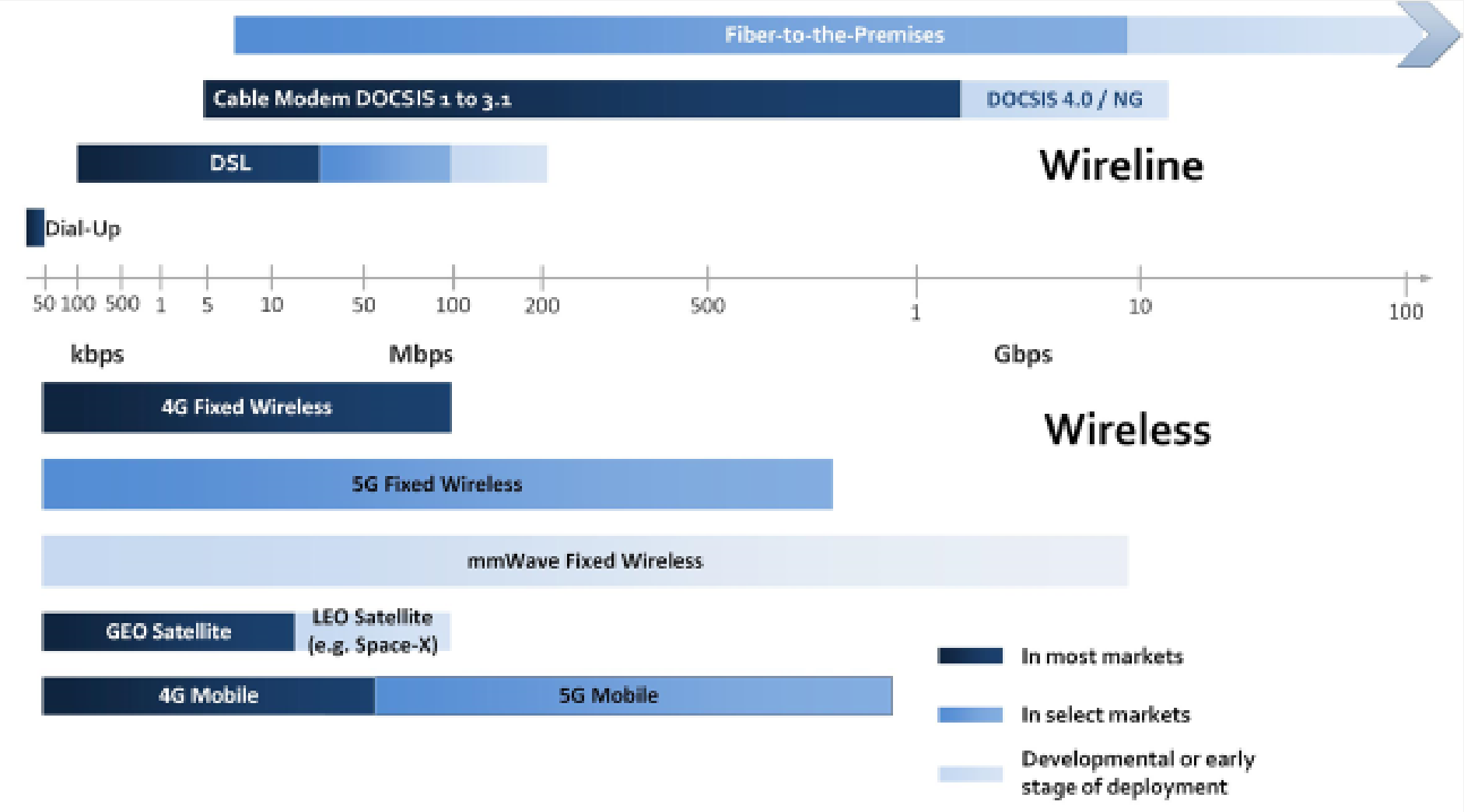
Educational Broadband Service (EBS)

Citizens Broadband Radio Service (CBRS), licensed and unlicensed bands

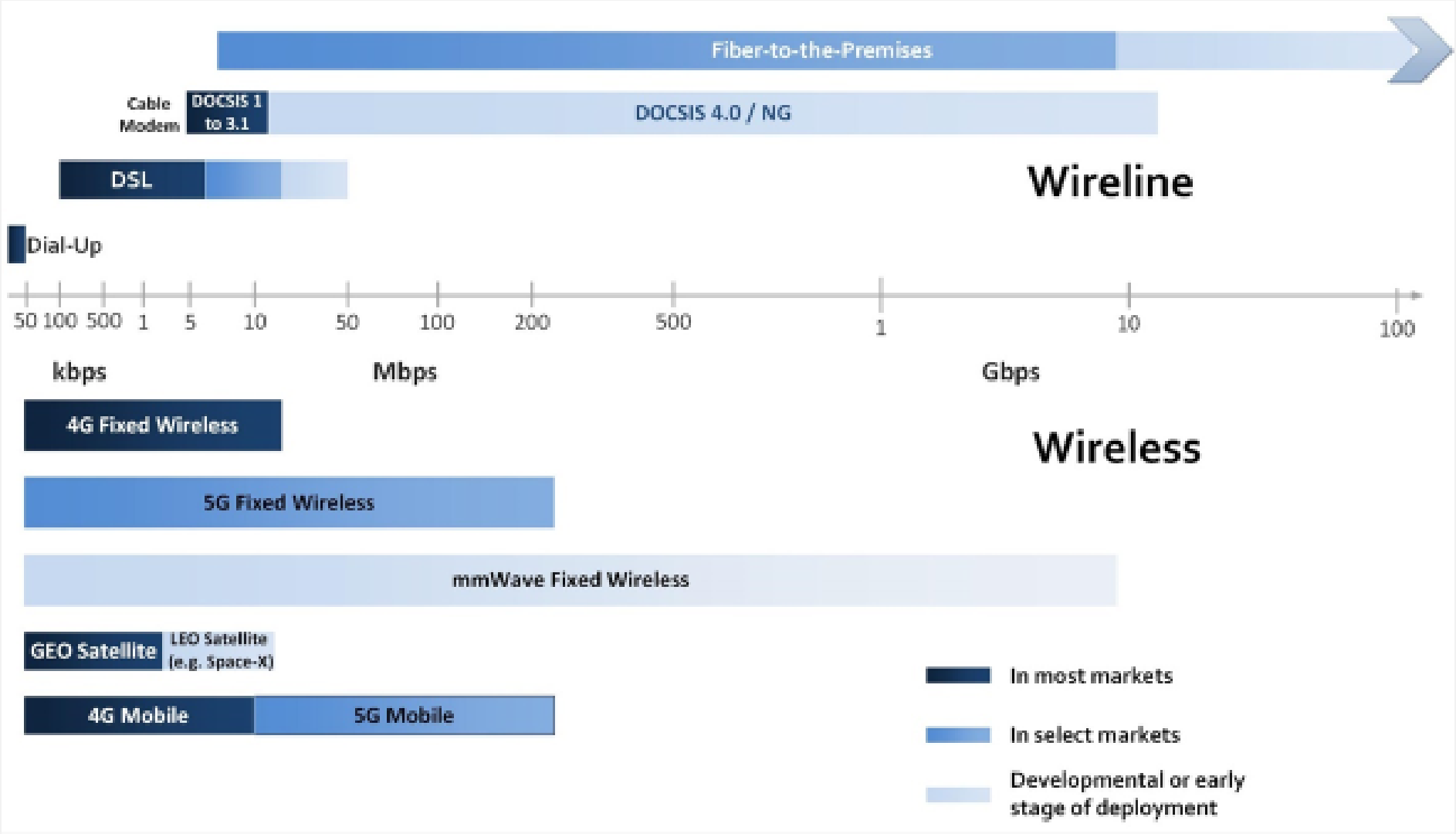
Millimeter wave (mmWave), licensed and unlicensed bands



TYPICAL DOWNLOAD SPEEDS OF FIXED WIRELESS AND WIRELINE TECHNOLOGIES



TYPICAL UPLOAD SPEEDS OF FIXED WIRELESS AND WIRELINE TECHNOLOGIES



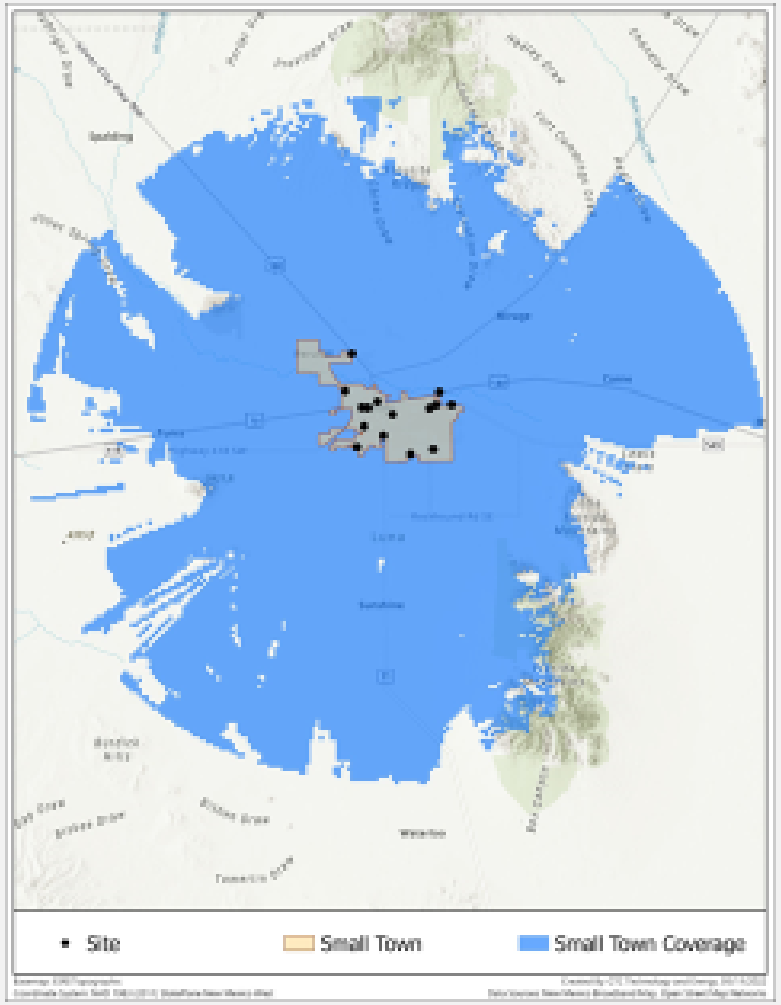
AVAILABLE SPECTRUM AND TECHNOLOGY SHARPLY LIMITS THE CAPACITY PER HOUSEHOLD

Adding antennas is a costly and imperfect way to increase capacity

Costs increase in rural areas that lack high towers or rooftops for mounting antennas

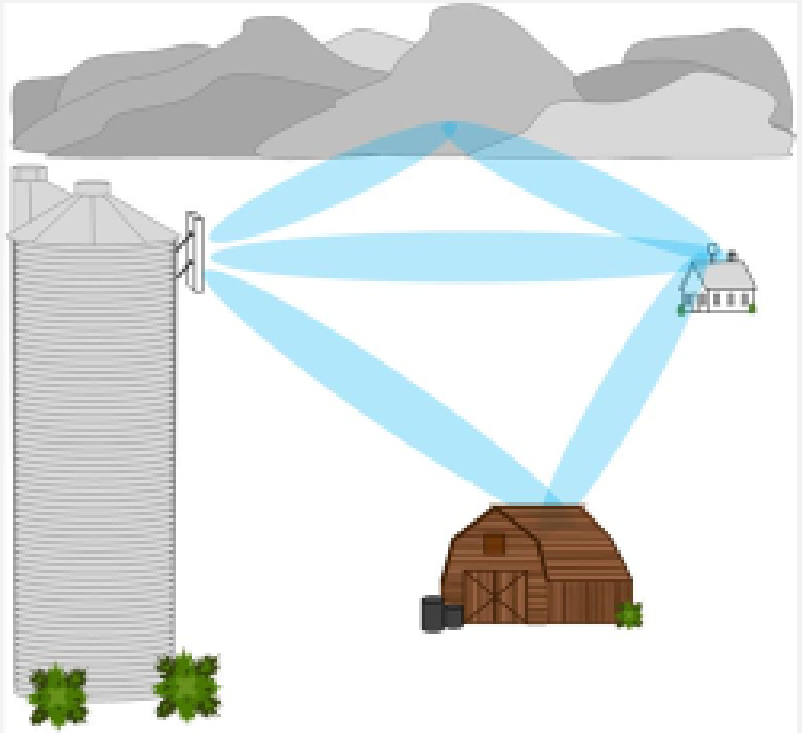
A model for the town of Deming, NM, illustrates the issue:

- All of the town's homes and businesses could be served by antennas on one central site
- HOWEVER, 10 towers would be needed to deliver 100 Mbps broadband service to those locations—because only a few hundred households can be served per tower

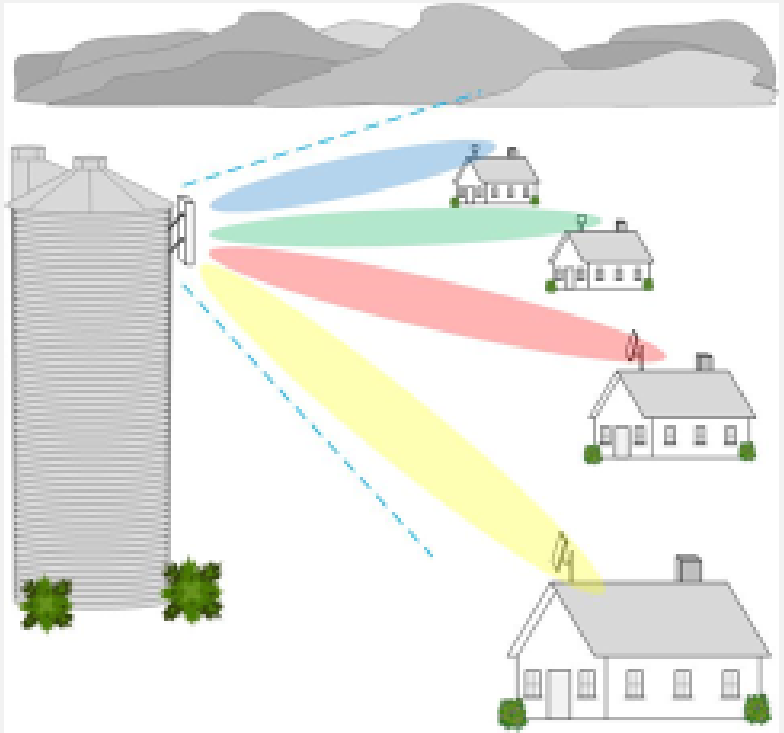


NEW FIXED WIRELESS DEVELOPMENTS ARE LEADING TO FASTER FIXED WIRELESS NETWORK SPEEDS

Point-to-multipoint fixed wireless network using MIMO



Point-to-multipoint fixed wireless network using beamforming



MANY CHALLENGES IN DEPLOYING FIXED WIRELESS TO DELIVER BROADBAND SERVICE IN RURAL AREAS

Fixed wireless networks do not have a predictable physical connection

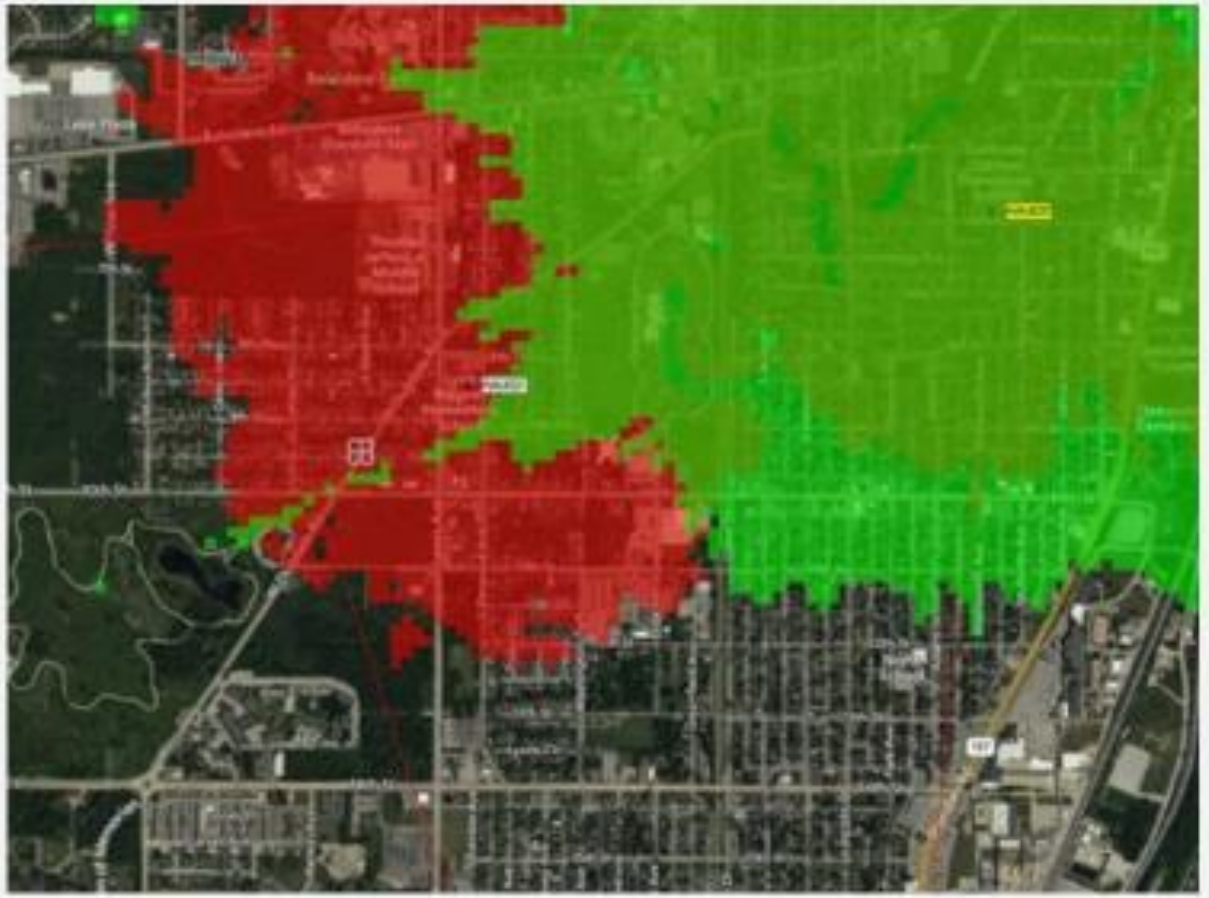
- Designing a fixed wireless network—particularly one intended to serve all the households in a large area—requires making assumptions and allowances for many unknown and uncontrollable parameters:
  - Line-of-sight requirements between antennas
  - Spectrum availability
  - Weather (i.e., reducing signal quality and alignment of antennas)
- Fixed wireless networks need dense antenna deployments to achieve high capacity and line-of-sight requirements
  - Requirement is more stringent for high-speed, high-frequency mmWave

NEAR LINE-OF-SIGHT IS REQUIRED FOR MOST HIGH-CAPACITY FIXED WIRELESS NETWORKS

Some user locations will be obstructed in almost any type of antenna siting

A sample propagation map illustrates the effects of obstructions:

- Locations in the green area are well-served; addresses in the red areas receive deteriorated performance
- Green areas end in rough fingers at the "cell edge"—where the network performance is not consistent



COST COMPARISONS ILLUSTRATE FIXED WIRELESS FINANCIAL SHORTCOMINGS AS PERMANENT SOLUTION

Capital and operating costs—and total long-term cost of ownership—are key factors

Candidate fixed wireless and fiber-to-the-premises networks were designed in four rural deployment scenarios:

1. Small town
2. Medium-density rural
3. Low-density rural
4. Very-low-density rural

KEY COST FACTORS IDENTIFIED BY ANALYSIS ACROSS POPULATION DENSITY MODELS

Comparing candidate fixed wireless and fiber network deployments

Initial capital costs are higher for fiber than for fixed wireless network deployments

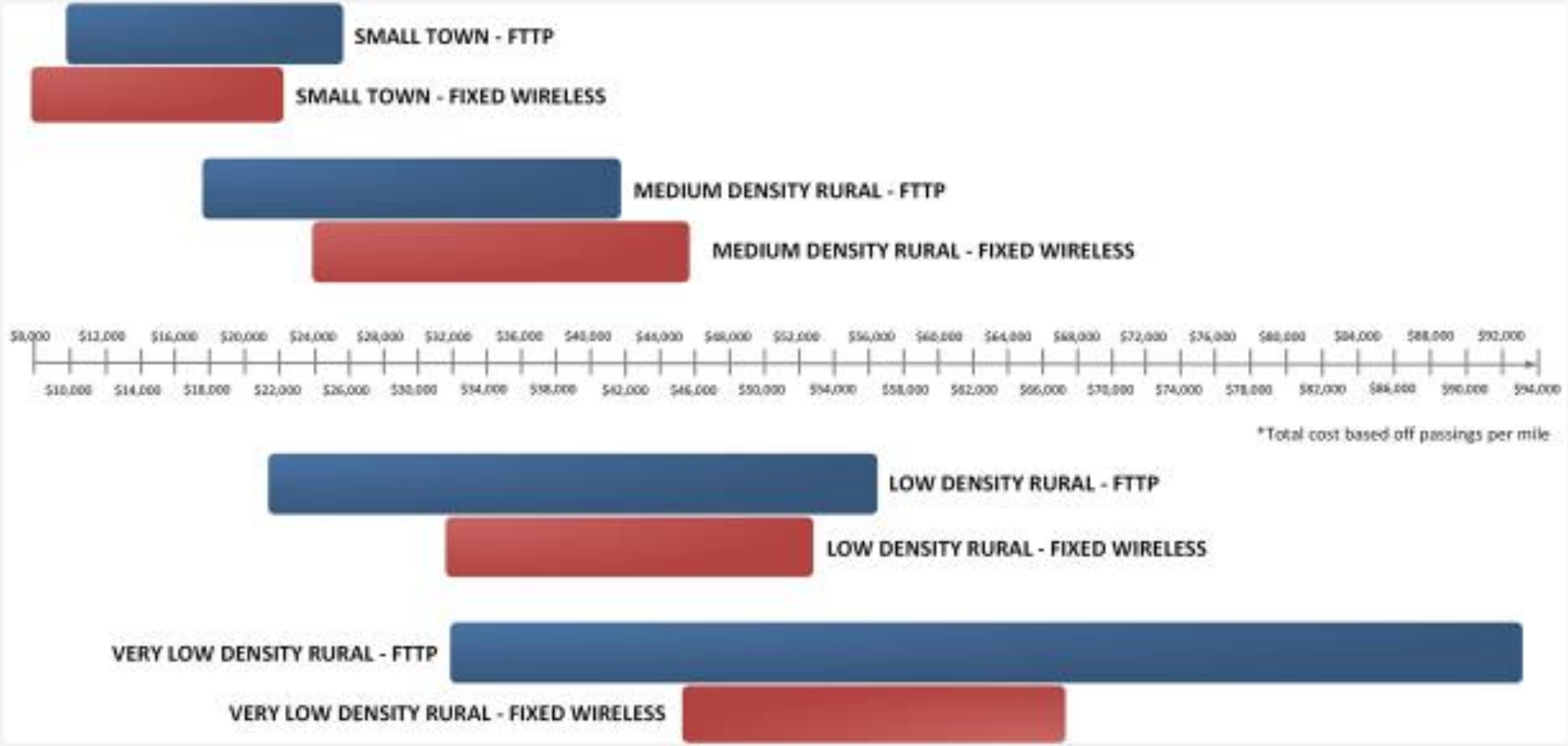
- Most of the capital cost for fiber relates to construction
- Capital costs for fixed wireless deployments dominated by customer premises equipment; in rural areas, another large cost is construction of tower sites (where no towers or buildings are available for antenna siting)

Ongoing operational costs for fixed wireless are higher than for fiber—largely due to equipment replacement:

- For a fixed wireless network, 40 to 80 percent of the capital investment needs to be replaced every five years
- Only 1 to 10 percent of the capital cost of a fiber network is replaced every 10 years

30-YEAR TOTAL COST OF OWNERSHIP SHOWS OVERLAP IN FIXED WIRELESS AND FIBER COSTS

With similar costs, prudent investment is fiber—for better performance and quality



CONCLUSION: FIXED WIRELESS PROVIDES LESS LONG-TERM VALUE FOR MOST UNSERVED AREAS

In the long term, fiber and fixed wireless costs are comparable, taking into account that fixed wireless requires frequent replacement of the system

Not a foregone conclusion that very high-cost unserved areas are cheaper with wireless than fiber, especially when considering lifetime costs

Fully and consistently serving unserved households in a rural area is less complex using fiber, which does not face challenges of line of sight

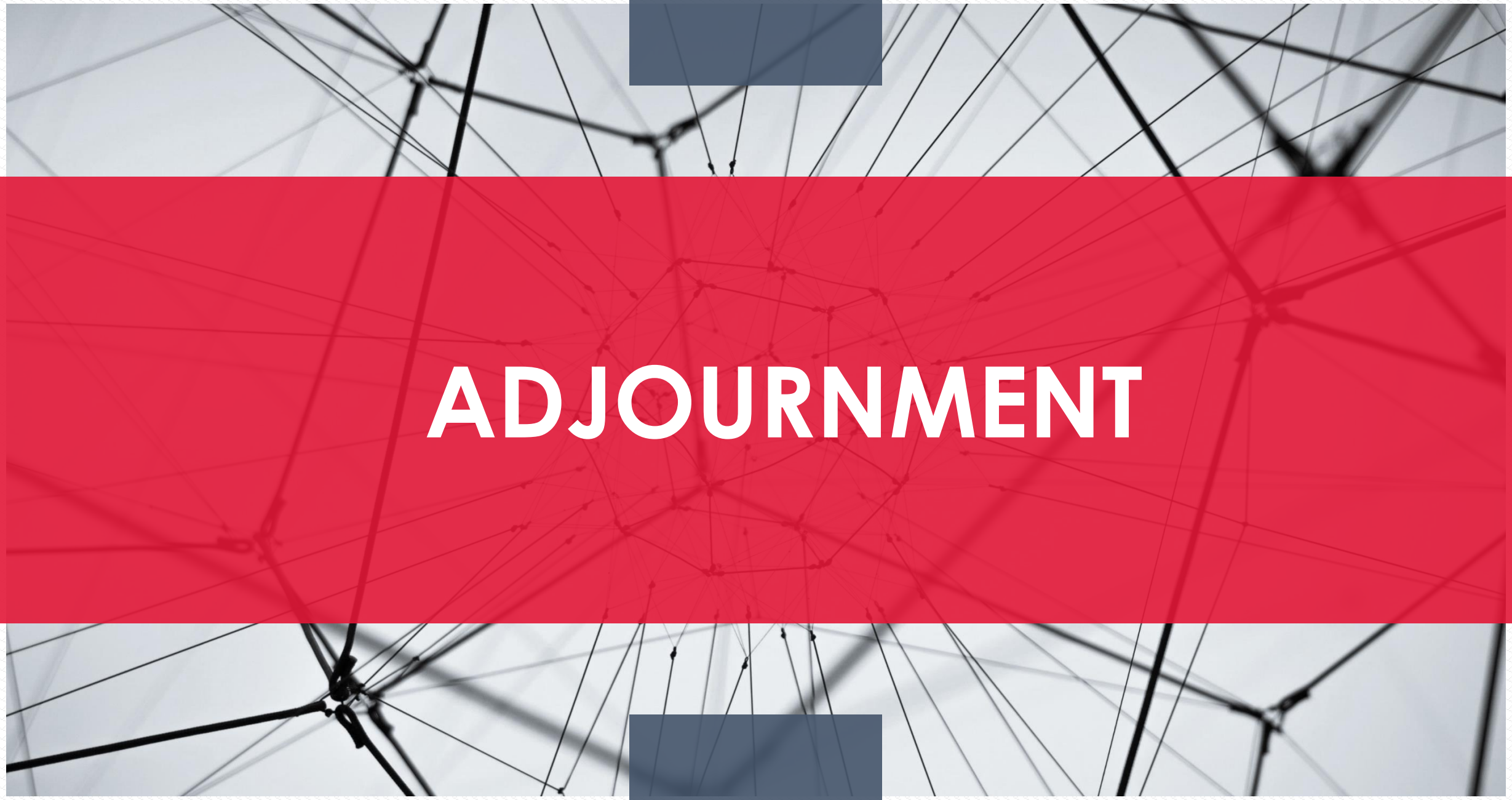
Fiber is sustainable, scalable, and renewable; offers many times greater capacity (which will remain several steps ahead of fixed wireless); and offers predictable performance, lower maintenance costs, and a longer technological lifetime than fixed wireless technologies

QUESTIONS?

Matt Schmit | Chair
Illinois Broadband Advisory Council
broadband@Illinois.gov

NEXT REGULAR MEETING

WEDNESDAY, FEBRUARY 15



ADJOURNMENT